



## RAILROAD COMMISSION OF TEXAS HEARINGS DIVISION

**OIL AND GAS DOCKET NO. 01-0284921**

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**THE APPLICATION OF PYOTE WELL SERVICE LLC, PURSUANT TO STATEWIDE  
RULE 9 FOR THE LEHMAN SWD LEASE, WELL NO. 2 PEARSALL (AUSTIN CHALK)  
FIELD, FRIO COUNTY, TEXAS**

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**HEARD BY:**

Richard D. Atkins, P.E. - Technical Examiner  
Michael Crnich - Legal Examiner

**PFD PREPARED BY:**

Karl Caldwell - Technical Examiner  
Terry Johnson - Legal Examiner

**PROCEDURAL HISTORY**

Application Filed:	May 2, 2013
Protest Received:	May 22, 2013
Request for Hearing:	September 27, 2013
Original Notice of Hearing:	December 18, 2013
Amended Notice of Hearing:	December 23, 2013
Hearing Held:	January 31, 2014
Transcript Received:	February 18, 2014
Late-Filed Exhibit Requested:	June 17, 2014
Late-Filed Exhibit Received:	June 25, 2014
Proposal for Decision Issued:	November 4, 2014

**APPEARANCES:**

**REPRESENTING:**

**APPLICANT:**

John Soule (Attorney)  
Billy Doucette (Operations Manager)  
William F. Wilson, P.G. (Geologist)  
Kerry Pollard, P.E. (Engineer)  
Jenni Usher (Agent)

Pyote Well Service, LLC

**PROTESTANT:**

Dr. Ronald Green (Geologist)

Frio County

**INTERESTED PARTIES:**

Jesus Salinas (County Commissioner, Precinct 1)  
Carlos Garcia (County Judge)  
Dario Guerra (Owner)

Frio County Commissioners Court  
Frio County  
Derby ING Utility

**OBSERVER:**

Sally Velasquez (Government Affairs)

Frio County

**EXAMINERS' REPORT AND PROPOSAL FOR DECISION****STATEMENT OF THE CASE**

Pyote Well Service, LLC. ("Pyote") requests commercial disposal authority pursuant to Statewide Rule 9<sup>1</sup> for the Lehman SWD Lease, Well No. 2, ("Pyote Well No. 2") Pearsall (Austin Chalk) Field, Frio County, Texas. Notice of the original application was published in the *Frio-Nueces Current*, a newspaper of general circulation in Frio and La Salle Counties, Texas on March 7, 2013. Notice of the original application was sent to the Frio County Clerk, the surface owner of the tract of the proposed disposal well location, as well as surface owners of all tracts adjacent to the proposed disposal well location. No offset operators were deemed to require notice as there are no operators within a one-half mile radius of the proposed location.

The original application was protested by Frio County. The notice of hearing for the original application was mailed by the Railroad Commission of Texas (Commission) on December 18, 2013. Pyote requested to amend the injection interval, injection volume, and injection pressure on December 18, 2013, after the original notice of hearing was mailed. Notice of the amended application was published in the *Frio-Nueces Current*, a newspaper of general circulation in Frio and La Salle Counties, Texas on December 5, 2013. Pyote provided notice on December 18, 2013 of the amended application to all parties on the original service list. An amended notice of hearing was mailed by the Commission on December 23, 2013.

**DISCUSSION OF THE EVIDENCE****Applicant's Evidence (Pyote)**

The proposed location of the disposal well is the Lehman SWD Lease, an 80 acre tract located approximately 8 miles north of Dilley, Frio County, Texas. Pyote currently operates a commercial disposal well on the Lehman SWD Lease, Well No. 1 ("Pyote Well No. 1"), which is permitted to dispose of salt water into the Olmos formation from 4,480 feet to 5,160 feet. Pyote proposes to drill a new well, Pyote Well No. 2, on the Lehman SWD Lease for commercial disposal and requests authority for the disposal of commercial salt water and RCRA exempt wastes.<sup>2</sup> The source of the salt water and RCRA exempt waste will be generated from the flow back of both hydraulic fracture stimulation water ("frac water") and produced water from wells completed in the Eagle Ford and Austin Chalk

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<sup>1</sup> 16 Tex. Admin. Code § 3.9

<sup>2</sup> Resource Conservation and Recovery Act: Examples of RCRA exempt oil and gas waste includes produced water, drilling fluids, frac flowback fluids, rigwash and workover wastes.

Formations in the area.

The proposed well construction is as follows:

1. The well will be drilled to a total depth (TD) of 9,500 feet.
2. 10 3/4-inch, 40 lb. per foot J-55 surface casing will be set at 3,300 feet in a 14 1/2-inch hole and cemented in place with 1,700 sacks of Class A cement, circulated back to surface.
3. A 7-inch, 26 lb. per foot, J-55 long string of casing will be set at a depth of 6,550 feet and a multi-stage cementing tool ("DV tool") will be set at 5,200 feet.
  - a. The casing will be cemented with 170 sacks of 50/50 Pozmix cement with an estimated top of cement behind the long string of approximately 5,900 feet from surface;
  - b. 535 sacks of cement will be pumped through a multi-stage cementing tool at 5,200 feet to bring the top of cement to approximately 3,200 feet from surface.
4. An open hole section, 6 1/8-inch in diameter, will be drilled from 6,550 feet to 9,500 feet.
5. Pyote is requesting 6,550 feet to 9,500 feet in the open hole section as the permitted disposal interval.
6. 3 1/2-inch tubing will be run inside the 7-inch casing and a packer set on the end of the tubing at 6,450 feet.
7. The maximum daily injection volume will be 25,000 barrels per day (bpd).
8. The maximum surface injection pressure will be 3,250 pounds per square inch (psi).

The Commission's Groundwater Advisory Unit (GAU) identifies the base of the usable-quality groundwater (BUQW) at the proposed disposal well location at a depth of 3,100 feet. Furthermore, the Carrizo Formation from 1,350 feet to 1,950 feet contains superior quality water which must be isolated from water in underlying and overlying beds. The proposed surface casing program will set 10 3/4-inch surface casing at 3,300 feet and circulate cement to surface to isolate and protect the BUQW.

Once the surface casing is set and cemented, the well will be drilled to a depth penetrating the lower section of the Georgetown Formation. Pyote expects this to be encountered at a depth of approximately 6,700 feet, where the 7-inch long string casing

will be set. Pyote's expert engineering witness, Kerry Pollard P.E. ("Pyote's engineering expert"), acknowledged the depth of 6,700 feet is deeper than the upper injection interval identified on the amended W-14 form of 6,550 feet. Pyote's engineering expert stated that Pyote's intention is to set the long string of casing in the lower Georgetown Formation<sup>3</sup>. The multi-stage cementing tool will be set at 5,200 feet to pump cement to approximately 3,200 feet from surface, which will be above the base of the surface pipe. According to Pyote engineering expert, the 7-inch casing will be cemented from the bottom of wherever the lower Georgetown Formation is found, up to a height of 5,900 feet from surface. Pyote's engineering expert testified that the purpose of cementing the 7-inch casing from the base of the casing to a height of 5,900 feet from surface is to isolate the Eagle Ford and Austin Chalk Formations which are considered productive formations in the area. Pyote's engineering expert stated that the reason for not circulating cement to surface outside the 7-inch casing is to afford Pyote the ability to monitor the pressure in the annulus between the long string and the surface casing as a safeguard.

Within a one-quarter mile radius of Pyote Well No.2's proposed location, four existing wells were identified. None of the four wells penetrate the proposed disposal interval of 6,550 feet to 9500 feet. Two of the wells have been plugged, which were originally drilled to total depths of 6,300 feet and 6,516 feet, respectively. The other two wells are active disposal wells. Pyote Well No. 1, was drilled to a TD of 6,121 feet with a permitted disposal interval from 4,580 feet to 5,160 feet. The New Wittman Lease, Well No. 1, operated by RCLJ Construction, Inc., has a bridge plug set at 5,700 feet. This well is permitted for disposal between 4,650 feet and 5,240 feet, with perforated intervals of 4,680 feet to 4,718 feet and 5,168 feet to 5,192 feet.

Pyote submitted the original commercial disposal permit application on May 2, 2013 that identified the Olmos Formation as the disposal formation and requested an injection interval from 4,500 feet to 5,250 feet, with a maximum disposal volume of 10,000 bpd. An amended application was filed on December 18, 2013 that requested to dispose into the Lower Cretaceous Formation from 6,500 feet to 9,500 feet, with a maximum daily injection volume of 25,000 bpd. Five days later, on December 23, 2013, the injection interval was amended again, lowering the upper injection depth from 6,500 feet to 6,550 feet.

Mr. William Wilson, P.G., ("Pyote's expert geologist") testified on behalf on Pyote on the suitability of the proposed Lower Cretaceous interval for disposal. Pyote's expert geologist testified that he reviewed 33 well logs within a 10 mile radius of the proposed location of Pyote's Well No. 2 in conducting research of the area.

Three well logs were admitted into evidence during the hearing and used to support Pyote's expert geologist's testimony:

Well Log 1. The Kinlaw Oil Corporation Peterson Lease, Well No. 1 (API No. 163-32682) was originally drilled as a producing well. The well has since

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<sup>3</sup> Testimony of Kerry Pollard, P.E. Tr. 93-94

been converted to a disposal well and is the disposal well referred to as Pyote Well No. 1. This well is located approximately 1,080 feet south-southwest from the proposed location of Pyote Well No. 2. The well is logged through the Eagle Ford Formation to the top of the Buda Formation. The well is a deviated hole in which the vertical section has been converted to a commercial disposal well and the well is properly plugged below the interval permitted for disposal.

Well Log 2. The Fair Oil Company Petit, M.C. Lease, Well No. 1 (API No. 163-30367) is located 2,658 feet from the Pyote's Well No. 1 surface location in a west-northwest direction and west-southwest from the proposed Pyote Well No. 2. The Well Log No. 2 well is logged to a depth of 6,420 feet, showing the Anacacho, Austin Chalk, Eagle Ford, and Buda Formations.

Well Log 3. The Virtex Operating Company Inc. McWilliams Heirs A Lease, Well No. 1 (API No. 163-33390) is located 6.1 miles northwest of the Fair M-1 Petit Lease, Well No. 1. The Well Log No. 3 well is logged through the entire Buda, Del Rio, and Georgetown Formations and approximately 495 feet into the Edwards Formation.

The nearest well log to the proposed Pyote Well No. 2 is Well Log 1, the well that is now referred to as Pyote Well No. 1. The deepest formation penetrated and logged in Well Log 1 is the Buda Formation. Pyote's expert geologist correlated the top of both the Eagle Ford and Buda Formations in Well Log 1 to Well Log 2 and Well Log 3. Since Well Log 3 is the only well drilled and logged through the Buda and Del Rio Formations and into the Edwards Formation, it was used as the index log. Using the Buda Formation as the datum point and adjusting for elevation, Pyote's expert geologist projected the expected depth of the top of the formations at the proposed Pyote Well No. 2 as follows:

1. Del Rio Formation: 6,517 feet
2. Georgetown Formation: 6,632 feet
3. Edwards Formation: 6,723 feet

Pyote's amended Form W-14 application indicates the name of the disposal formation as the Lower Cretaceous Formation. Pyote's expert geologist stated that the Lower Cretaceous Formation is not a single formation but is comprised of several separate, individual formations, starting near the top of the Buda Formation and extending to the Washita or Jurassic system. During the hearing, both Pyote's expert engineer and expert geologist identified the Edwards Formation as the appropriate injection interval that Pyote is requesting authority to inject into.

Based on offset logs, Pyote's expert geologist recommends the lowermost portion

of the Georgetown Formation through the Edwards Formation as the disposal interval.<sup>4</sup> Additionally, Pyote's expert geologist recommends setting the 7-inch casing in the lower portion of the Georgetown Formation as it appears to be non-porous and hard limestone, conducive to achieving a good cement bond between the casing and formation. Pyote's expert geologist estimated that an open hole completion in the Edwards Formation would readily accept the injection of 25,000 bpd and further estimated that the Edwards Formation could take upwards of 30,000 to 40,000 bpd.<sup>5</sup>

Pyote's expert geologist identified the Del Rio Formation as the seal above the Georgetown Formation that will protect the hydrocarbon-bearing Austin Chalk and Eagle Ford Formations as well as the freshwater zones above the injection interval. The Del Rio Formation is expected to be 80 to 100 feet thick at the proposed disposal well location. In addition, the low porosity, hard limestone characteristics of the Lower Georgetown Formation where casing will be set will confine fluids injected below the Lower Georgetown Formation.

To ensure the proposed injection interval would not contain usable quality water, Pyote's expert geologist consulted the Texas Water Development Board database to plot wells and identify water zones with usable quality water in the vicinity of the proposed disposal well location. The deepest well in the area is drilled to a depth of 1,867 feet in the Carrizo-Wilcox aquifer.

Frio County is one of many counties in Texas where wells have been drilled and completed targeting the Eagle Ford shale play. Wells drilled targeting the Eagle Ford Formation are typically horizontal wells requiring a large volume of water during hydraulic fracture stimulation treatments. During the early stages of flowback after completion, the wells flow back large volumes of hydraulic fracture stimulation load water. Jenni Usher, an agent for Pyote, indicated that the number of drilling permits issued in the Eagle Ford shale area has increased year-over-year for the past five years, from 26 drilling permits issued for Eagle Ford shale wells in 2008 to 4,416 permits issued in 2013. As of January 6, 2014, there are 5,504 permitted well locations representing pending oil or gas wells, where either the operator has not yet filed completion paperwork with the Commission, or the completed well has not yet been set up with a Commission identification number. There are also 5,021 oil wells and 2,468 gas wells on schedule in the Eagle Ford shale play, as of January 6, 2014.

There are eleven active commercial disposal wells within a ten mile radius of the proposed Pyote Well No. 2. All of the current active disposal wells within the ten mile radius have been permitted for injection into either the Olmos, San Miguel, or both formations. The majority of these disposal wells are located south of the proposed Pyote Well No. 2. There are three active disposal wells within a four mile radius of the proposed

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<sup>4</sup> Testimony of William Wilson, P.G. Tr. 83

<sup>5</sup> Testimony of William Wilson, P.G. Tr. 85-86

Pyote Well No. 2:

1. The Pyote Well No.1 would only be used when the proposed Pyote Well No. 2 could not dispose of salt water;
2. The New Wittman Lease, Well No. 1 (API No. 163-32760), operated by RCLJ Construction, Inc. only accepts its own trucks for disposal and is considered a private facility;
3. The FF Dilley SWD Lease, Well No. 1 (API No. 163-33636), operated by Greenhunter Water, LLC is permitted to inject a maximum of 25,000 bpd into the Olmos and San Miguel Formations.

An additional seven permits for commercial disposal wells have been issued within a ten mile radius of the proposed disposal well location. However, the permits had not been activated prior to the hearing date of the subject docket. Of these seven permits, two have been permitted for disposal into the Edwards Formation. The other five are permitted for disposal into either the Olmos or the Olmos and Miguel Formations.

The Lehman SWD lease is an 80 acre tract where Pyote has an existing operational commercial disposal well and facility. Pyote has experienced a greater demand for disposal at Pyote Well No. 1 than its current capacity allows. Pyote is applying for an additional disposal well, Pyote Well No. 2, on the Lehman SWD lease as the current wait time to dispose into Pyote Well No. 1 is 20 to 30 minutes. Pyote Well No. 1 is permitted to dispose of waste in the Olmos Formation and the disposal capacity is limited to 5,000 bpd. If the permit application for the proposed Pyote Well No. 2 disposal well is granted, the Pyote Well No. 2 will be the primary disposal well. Pyote Well No. 1 will be retained for use during times of maintenance or temporary shut-down of Pyote Well No. 2.

There are two entrances on the south side of the current Pyote disposal facility with access to CR 4425, commonly referred to as Derby Road. The proposed disposal well will be drilled approximately 1,800 feet from the current facility. Oil and gas waste will be pumped through a fiberglass line from the facility to the new disposal well. If the subject application is approved, Pyote intends to construct a new unload facility on the north side of the current facility which, in Pyote's opinion, will help to alleviate the congestion of trucks waiting on the south side of the facility near the entrances on CR 4425.

Pyote currently operates thirty-six disposal wells in South and West Texas. Pyote has Master Service Agreements in place with major operators, including Conoco Phillips, Shell, and Chesapeake. Pyote has a current, active P-5 with the Commission and a \$50,000 bond for financial assurance.

#### **Interested Parties/Observers' Comments**

Jesus Salinas, Frio County Commissioner, Precinct 1 and Carlos Garcia, Frio

County Judge attended the hearing and made public comments. Dario Guerra, owner of Derby ING Utility ("Derby ING"), the water supplier for the town of Derby, objects the commercial disposal well application and made a public comment.

Jesus Salinas, Frio County Commissioner, Precinct 1 is concerned with the potential for an increase in truck traffic near the town of Derby if the disposal well application is granted. In Mr. Salinas's opinion, oil and gas production in Frio County is lower than other nearby counties, but Frio County has been attracting disposal wells. Mr. Salinas believes disposing of waste in Frio County does not have a value to the county. Mr. Salinas is also concerned that the quality of life for residents of Derby may be hindered and the commercial disposal well may pose a risk to the water supply.

Carlos Garcia, Frio County Judge, represents the constituents of Frio County and is concerned with the possibility of human error during the operation of the disposal well and the potential negative impact on the community.

Dario Guerra, owner of Derby ING, made a statement wanting to ensure the water resources in the area are protected.

#### **Protestant's Evidence (Frio County)**

Pyote's application for a commercial disposal well is protested by Frio County, represented by Dr. Ronald Green, a geologist. Dr. Green states that Frio County is concerned with the request by Pyote to extend the injection interval to a total depth of 9,500 feet which includes the Glen Rose Formation. Dr. Green believes the Glen Rose Formation may contain water that may be usable in the future. Dr. Green states that in nearby Dimmit County there is evidence that the quality of water in the Glen Rose Formation is brackish, less than 10,000 ppm.<sup>6</sup> In Mr. Green's opinion, the Glen Rose Formation is at a depth and water quality that is not economical at this time, but in the future, the water contained in the Glen Rose Formation may be of economic value. Dr. Green states that Frio County does not want that possible resource spoiled by the disposal of fluids into the Glen Rose Formation. In Dr. Green's opinion, there is no conclusive evidence at the present time to demonstrate the quality of water in the Glen Rose Formation at the proposed Pyote Well No. 2 location.

Dr. Green cross-examined Pyote's expert geologist on the water quality of the Lower Cretaceous interval requested for disposal in the application. Dr. Green accepts Pyote's expert geologist's conclusion that the water quality of the Edwards Formation is 100,000 ppm total dissolved solids (TDS) in the area of the proposed disposal well. Dr. Green does not accept Pyote's expert geologist's determination that the water quality of the Glen Rose Formation is saline, or greater than 16,000 ppm TDS in the area of the proposed disposal

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<sup>6</sup> The concentration referred to is assumed to be Total Dissolved Solids (TDS), since the USDW value of 10,000 ppm is referenced in the transcript as a comparison.

well. Pyote's expert geologist estimated the water quality of the Glen Rose Formation using resistivity measurements from an offset log located approximately five miles north of the proposed disposal well location. In Dr. Green's opinion, TDS concentrations can not be determined from resistivity readings on a well log, only a judgement of fresh water or salt water can be made. Salt water may be generalized as low or high concentration. In Dr. Green's opinion, there is no evidence to characterize the water quality in the Glen Rose Formation at the proposed disposal location at this time.

### **Examiners' Request for Additional Information**

Well log cross sections admitted into evidence during the hearing did not show the entire Cretaceous interval that Pyote requested for disposal authority. The interval requested for disposal was 6,550 feet to 9,500 feet while the correlative well log submitted by Pyote was not drilled or logged deeper than approximately 6,800 feet, which shows the upper 495 feet of the Edwards Formation. The Edwards Formation was identified by Pyote during the hearing as the recommended disposal formation within the Cretaceous interval. Since no logs identified the entire extent of the Edwards Formation, or any formations deeper than the Edwards Formation, the examiners requested additional information from Pyote. On June 17, 2014, a request was sent to Pyote to submit a correlative log cross section of the entire interval requested for disposal, with specific attention to identify formation depths within the Lower Cretaceous interval at the proposed disposal well location.

On June 25, 2014, per the examiners' request, Pyote late-filed a correlative well log cross-section that included the entire Cretaceous interval on one of the well logs, the Magnolia 1-McKinley well<sup>7</sup> ("Well Log No. 4"). In conjunction with that filing, Pyote's expert geologist stated that the deepest well drilled in Frio County is the Well Log No. 4 which was drilled to a TD of 11,951 feet in 1947. Well Log No. 4 is located approximately 16.48 miles northeast of the proposed disposal well location. Pyote's expert geologist suggested that since Well Log No. 4 is located approximately 16.48 miles northeast of the proposed Pyote Well No. 2 location, thickening of the entire Lower Cretaceous interval will probably place the formation tops at the proposed disposal well location at the following estimated depths:

Table 1: Late File Exhibit Estimated Formation Drill Depths

<u>Formation</u>	<u>Projected Drill Depth (Estimated)</u>
Austin Chalk	6,022 feet
Eagle Ford	6,242 feet
Buda	6,407 feet
Del Rio	6,517 feet
Georgetown	6,602 feet

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<sup>7</sup> No Well API Number, or Lease ID number or name was provided in the late-filed exhibit to further identify the well.

Edwards	6,732 feet
Glen Rose	7,175 feet
Pearsall	~ 9,000 feet
Sligo	~ 9,500 feet

Pyote's expert geologist concluded that the lowermost requested depth for disposal of 9,500 feet at the proposed disposal well location would be in the middle of the Pearsall Formation. Pyote's expert geologist stated that its intention is not to drill into the Pearsall Formation due to potential over-pressure problems and the lack of any injection targets.

Pyote was requested to send a copy of the late-filed exhibit to the Protestants. The Protestants were afforded an opportunity to respond to the exhibit and submit additional relevant evidence within ten days of receiving the late-filed exhibit from Pyote. No response was received from the Protestants on the late-filed exhibit.

### **EXAMINERS' OPINION**

The Commission may grant an application for a permit under Chapter 27 of the Texas Water Code, Subchapter C in whole or part and may issue a permit if it finds:

1. The use or installation of the injection well is in the public interest;
2. The use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation;
3. With proper safeguards, both ground and surface fresh water can be adequately protected from pollution; and
4. The applicant has made a satisfactory showing of financial responsibility as required by Section 27.073.

The examiners recommend approval of Pyote's application for commercial disposal authority, pursuant to Statewide Rule 9, for the Pyote Lehman SWD Lease, Well No. 2, Pearsall (Austin Chalk) Field, Frio County, Texas, but with an amended disposal interval.

The examiners do not recommend approval of the entire Lower Cretaceous interval from 6,550 to 9,500 feet as requested by Pyote. The evidence and testimony during the hearing identified the Edwards Formation as the appropriate disposal interval, with the ability to accept a greater daily volume of fluid than the applicant has requested. The testimony and exhibits submitted by the Applicant fail to provide any conclusive evidence on the requested injection interval deeper than the upper 495 feet of the Edwards Formation. The examiners recommend that the well be drilled and logged to a depth of 495 feet below the top of the Edwards Formation, or to the base of the Edwards Formation, if upon drilling and logging the well, the Edwards Formation is determined to be less than

495 feet in thickness.<sup>8</sup>

In the examiners opinion, Pyote has met its burden of proof in demonstrating that its proposed operations will not pollute freshwater or injure any oil, gas, or other mineral formation if it is permitted to set a long string of casing in the lower Georgetown Formation and inject fluid into either: (1) the upper 495 feet of the Edwards Formation; or (2) the entire Edwards Formation if, upon drilling and logging, it is determined that the Edwards Formation is less than 495 feet in thickness. No convincing evidence or testimony was provided by Pyote to support the request to inject into formations below the Edwards Formation.

During the hearing, Pyote's expert geologist estimated the top of the Del Rio Formation at 6,517 feet, the top of the Georgetown Formation at 6,632 feet, and the top of the Edwards Formation at 6,723 feet at the proposed disposal well location. Technical Examiner Richard Atkins pointed out that the proposed upper injection interval on the final amended Form W-14 application is 6,550 feet which would be in the Del Rio Formation, which Pyote's expert geologist describes as an upper confining interval for fluids injected below. Both Pyote's expert geologist and expert engineer stated that the long string of casing would most likely be set deeper than the 6,550 feet listed on Form W-14. Both also stated that the intent is to set the long string of casing in the Lower Georgetown Formation, which is projected to be at a depth of approximately 6,700 feet based on correlations with offset well logs. In the examiners opinion, setting the long string of casing in the lower Georgetown Formation, expected to be at a depth of approximately 6,700 feet, is the appropriate depth and not 6,550 feet, as listed on Form W-14.

Pyote is requesting the lower depth of the injection interval to be 9,500 feet. During the hearing, Technical Examiner Richard Atkins noted that the correlative well log submitted by Pyote was not drilled or logged deeper than 6,800 feet, which shows no more than the top 495 feet of the Edwards Formation. Pyote's expert geologist stated that the Edwards Formation is not expected to extend to a depth of 9,500 feet, and the lower depth requested for injection would be in the Glen Rose Formation. Pyote's expert geologist stated that Pyote would stop drilling at the base of the Edwards Formation if there is sufficient porosity and permeability in the formation.

Pyote's expert geologist testified during the hearing that the Edwards Formation would readily accept an injection volume of 25,000 bpd and could take upwards of 30,000 to 40,000 bpd, based on an evaluation of offset logs. Pyote's application for a commercial disposal well is for a maximum injection volume of 25,000 bpd and the estimated daily average injection volume is 10,000 bpd, as indicated on its Form W-14. In the examiners' opinion, the Edwards Formation is suitable for disposal, and based on expert testimony,

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<sup>8</sup> The thickness of the Edwards Formation may be less than 475 feet at the proposed Pyote Well No. 2 location. Although Pyote late-filed exhibit was given no weight, Pyote's expert geologist estimated the new top of the Edwards Formation at the proposed Pyote Well No. 2 location to be 6,732 feet and the top of the Glen Rose Formation to be approximately 7,175 feet. This results in an estimated thickness of the Edwards formation of 443 feet at the proposed Pyote Well No. 2 location.

the Edwards Formation is capable of accepting the maximum daily disposal volume Pyote requests.

During the hearing, the estimated depths of the Glen Rose and Pearsall Formations were not discussed. The offset well logs admitted into evidence during the hearing did not penetrate the Glen Rose or Pearsall Formations. The deepest depth shown on any log was approximately 6,745 feet, which was correlated to be approximately 495 feet into the Edwards Formation. The examiners requested that Pyote submit a late-field exhibit containing cross-sections to show a correlative well log of the entire requested injection interval at the proposed Pyote Well No. 2 location, as well as estimate formation depths within the entire requested injection interval from 6,550 feet to 9,500 feet.

The late-filed exhibit well log cross-section submitted by Pyote introduced one new well log, Well Log No. 4 that is located approximately 16.48 miles northeast of the proposed Pyote Well No. 2 location. The late-filed exhibit did not contain a Well API No., lease name, or survey information to identify the location of the well. The map cross-section submitted indicated the relative locations of the three log cross-sections, but did not contain a distance scale. As a result, the examiners can not confirm the location of the Well Log No. 4 or the log information for the well. There is no map legend, but there are lines on the map which may indicate the locations of faults that occur between Well Log No. 4 and the proposed location of Pyote Well No. 2. Well Log No. 4 was reduced in size to an extent in which no depths or log curves could be read. Lastly, the Applicant did not identify a past case establishing precedent for approving a disposal interval based on an offset log at this great a distance from the proposed disposal well location. As a result, the late-filed exhibit was given no weight.

The well construction of the proposed disposal well will protect the usable-quality groundwater as identified by the GAU. The GAU recommends that the usable-quality groundwater be protected to a depth of 3,100 feet. More specifically, the Carrizo Formation, from 1,350 feet to 1,950 feet, contains superior quality water which must be isolated from water in underlying and overlying beds. The proposed surface casing program will set 10-3/4 inch surface casing to a depth of 3,300 feet and circulate cement to surface to isolate and protect the BUQW. No wells within a one-quarter mile radius of the proposed disposal well location penetrate the proposed injection interval.

The geologist representing the protestant and the geologist representing the applicant had differing opinions on the water quality in the Glen Rose Formation at the proposed disposal well location. At the present time there is no measured data available characterizing the water quality of the Glen Rose Formation at the proposed disposal well location. In the absence of evidence to the contrary, the examiners accept the GAU's determination that the BUQW at the proposed disposal well location is located at a depth of 3,100 feet.

Pyote has an active commercial disposal well and facility at the proposed location for the Pyote Well No. 2. Pyote has experience operating disposal wells and currently

operate 36 disposal well in South and West Texas. In the examiners' opinion, Pyote meet the requirement that the proposed disposal well be in the public interest, as there is an apparent need for additional disposal capacity.<sup>9</sup> Pyote has experienced a greater demand for disposal at the Pyote Well No. 1 facility than current capacity allows. The proposed Pyote Well No. 2 will provide additional disposal capacity and Pyote intends to construct a new off-load facility on the north side of the current disposal facility to reduce wait time and traffic congestion at the south side of the facility.

Frio County protested the disposal well application and was represented by Dr. Green. Frio County does not want injection into the Glen Rose Formation. Frio County is of the opinion that the water contained in the Glen Rose Formation may be of economic value at some point in the future. Frio County acknowledged that due to the depth and water quality of the Glen Rose Formation it is uneconomic to use at this time. However, that source of water may be of economic value in the future and the county does not want that potential resource polluted by disposal fluids. Dr. Green did not submit any evidence to demonstrate the quality of the water in the Glen Rose Formation. However, In the examiners' opinion, Pyote's expert witnesses did not present any convincing evidence to support the request to inject fluids into any formations below the Edwards Formation.

The examiners conclude that Pyote has made a satisfactory showing of financial responsibility as required by Section 27.073 of the Texas Water Code. Pyote has a current, active P-5 with the Commission and a \$50,000 bond for financial assurance.

#### **FINDINGS OF FACT**

1. Notice of Pyote's original application was published in the *Frio-Nueces Current*, a newspaper of general circulation in Frio and La Salle Counties, Texas, on March 7, 2013.
  - a. Notice of Pyote's amended application was published in the *Frio-Nueces Current*, a newspaper of general circulation in Frio and La Salle Counties, Texas, on December 5, 2013.
2. Notice of the original application was sent to the Frio and La Salle County Clerks, the surface owner of the disposal tract and each tract adjoining the disposal tract. No offset operators were deemed to require notice as there are no operators within a half-mile of the proposed location.
  - a. On December 18, 2013, Pyote provided notice of the amended application to all parties on the original service list.

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<sup>9</sup> The "public interest" finding required by Texas Water Code 27.051(b) is limited to matters related to oil and gas production, and does not include issues such as traffic safety and road conditions.

3. With proper safeguards, both ground and surface fresh water can be adequately protected from pollution.
  - a. The proposed well construction of the Lehman SWD Lease, Well No. 2 will not endanger useable quality water provided the 7-inch long string casing is set no higher than the lower Georgetown Formation, estimated to be at a depth of approximately 6,700 feet, and not at 6,550 feet as listed on the amended Form W-14.
  - b. The Commission's Groundwater Advisory Unit recommends that usable-quality groundwater be protected down to a depth of 3,100 feet below the land surface. In conformity with this recommendation:
    - i. The well will have 10 3/4-inch surface casing set at 3,300 feet in a 14 1/2-inch hole and cementing in place with 1,700 sacks of Class A cement, circulated back to surface. This is 200 feet below the usable-quality water depth of 3,100 feet;
    - ii. No wells located within a one-quarter mile radius of the proposed disposal well penetrate the proposed disposal interval.
4. The use or installation of the disposal well will not endanger or injure oil, gas, or other mineral formation.
  - a. The Austin Chalk and Eagle Ford Formations are the only productive intervals identified within a two mile radius of the proposed disposal well location.
  - b. The Del Rio Formation in the area is approximately 80 to 100 feet thick and relatively impermeable, acting as a barrier to fluids injected below.
  - c. There are low porosity and low permeability sections within the Georgetown Formation that act as a barrier to the upward migration of fluids.
5. Granting disposal authority into the Edwards Formation is in the public interest.
  - a. Pyote is currently operating a commercial disposal well and facility on the same 80 acre tract where the proposed disposal well will be drilled.
    - i. Pyote is experiencing a greater demand for disposal at the

Pyote Well No. 1 than current capacity allows;

- ii. The current wait time to dispose into the Pyote Well No. 1 is 20 to 30 minutes;
  - iii. Pyote Well No. 1 is permitted to dispose of waste in the Olmos Formation with a disposal capacity limited to 5,000 bpd.
- b. The Edwards Formation is the appropriate disposal interval in this application.
6. Pyote has established that the company is in good financial standing should the application be approved and the permit granted. Pyote has a current, active P-5 with the Commission and a \$50,000 bond for financial assurance.


#### **CONCLUSIONS OF LAW**


- 1. Resolution of the subject application is a matter committed to the jurisdiction of the Railroad Commission of Texas. Tex. Nat. Res. Code § 81.051.
- 2. All notice requirements have been satisfied. 16 Tex. Admin. Code § 3.9.
- 3. The proposed fluid disposal operations will not endanger oil, gas or geothermal resources or cause the pollution of freshwater strata unproductive of oil, gas or geothermal resources. 16 Tex. Admin. Code § 3.9.
- 4. As limited by the examiners' recommendation, Pyote Well Service, LLC has met its burden of proof and its application satisfies the requirements of Chapter 27 of the Texas Water Code and the Railroad Commission's Statewide Rule 9.

#### **EXAMINERS' RECOMMENDATION**

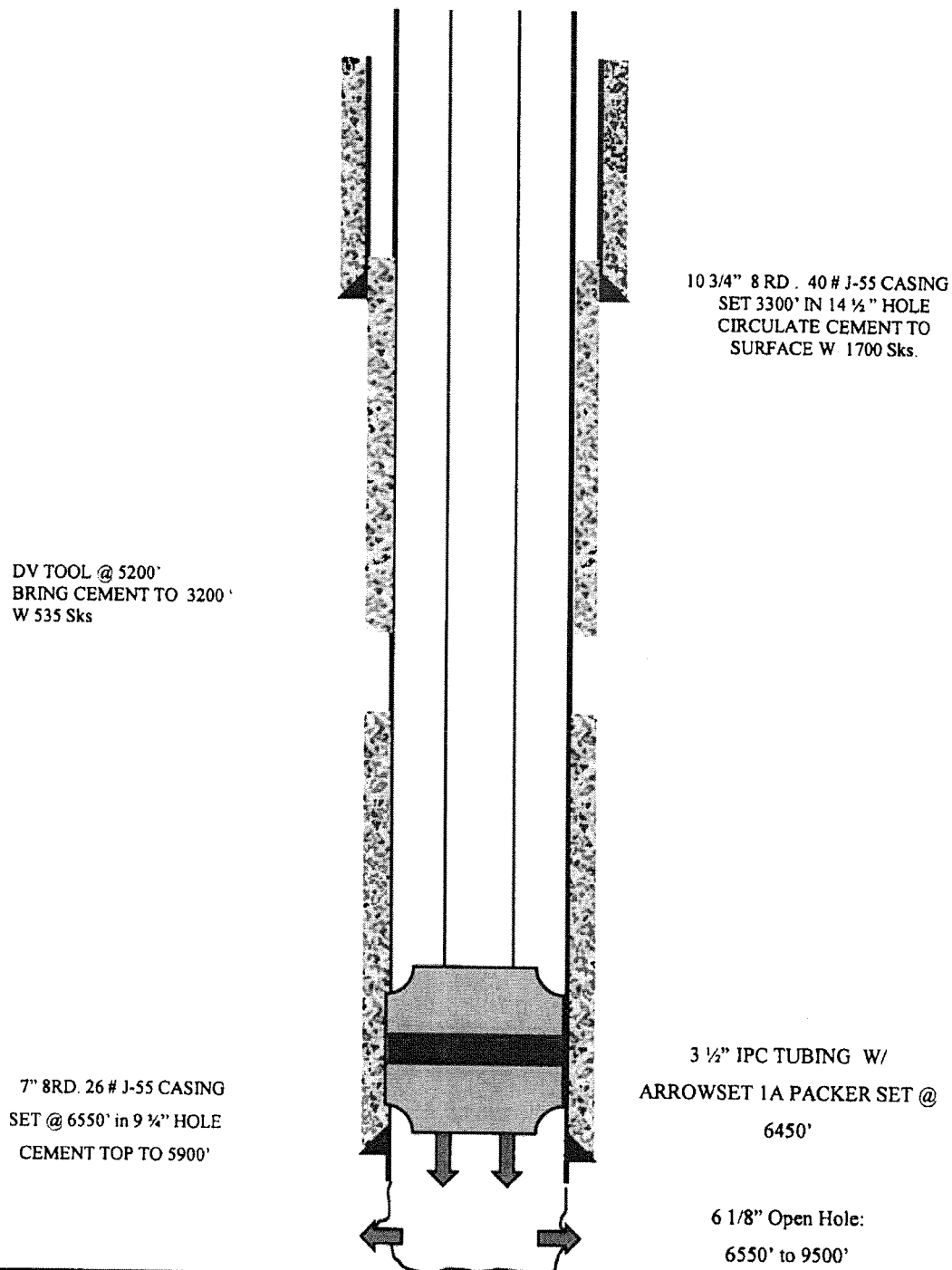
Based on the above findings of fact and conclusions of law, the examiners recommend that the application of Pyote Well Service, LLC. for commercial disposal authority pursuant to Statewide Rule 9 for the Lehman SWD Lease, Well No. 2, Pearsall (Austin Chalk) Field, Frio County, Texas, be approved with an amended disposal interval, as set out in the attached Final Order.

Respectfully submitted,

  
Karl Caldwell  
Technical Examiner

  
Terry J Johnson  
Legal Examiner

Appendix 1  
PROPOSED  
WELLBORE SCHEMATIC  
G.L.ELEVATION 504.2'



PYOTE WELL SERVICE, LLC  
LEHMAN SWD #2

Latitude 28.77788885 N Longitude 99.14702384' W (NAD 27)  
15068' FSWL & 3041' FNWL OF A.C. Casanola SUR. A-156, FRIO COUNTY, TEXAS